

# *EUCALYPTUS WIMMERENSIS*, A NEW SPECIES OF *EUCALYPTUS* (MYRTACEAE) FROM VICTORIA AND SOUTH AUSTRALIA

by

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## ABSTRACT

Rule, K. *Eucalyptus wimmerensis*, a new species of *Eucalyptus* from Victoria and South Australia. *Muelleria* 7(2): 193–201 (1990)—*Eucalyptus wimmerensis* K. Rule a sporadically distributed, relatively rare, mallee-box species of the Wimmera Region of Western Victoria and the Upper South East of South Australia is described and other mallee-box species with which it has been confused and/or has close affinities are discussed. Also discussed is its conservation status.

## INTRODUCTION

An unnamed mallee-box eucalypt consists of a small number of concentrated populations which are scattered over a wide area in the Victorian Wimmera and adjacent areas of South Australia. These mallees are usually small-growing and characterised by semi-lustrous, relatively narrow adult leaves and smooth stems with occasional fibrous basal bark.

In the past these populations have been perceived as either *E. viridis* R. T. Baker or *E. odorata* Behr ex Schldl. Blakely (1965), in his circumscription of the genus, was under the impression that populations in the Dimboola area and other unspecified parts of the Wimmera belonged to *E. odorata* and cited them in his account of that species. Later, Willis (1973) made a brief reference to a population in the Lawloit Range between Nhill and Kaniva as being *E. viridis*, but conceded that its mallees possessed broader adult leaves and larger fruits than was typical for that species. Subsequent authors dealing with Victorian eucalypts have retained these mallee populations under the umbrella of *E. viridis*, as their distribution maps have clearly indicated. These include Costermans (1981), Brooker and Kleinig (1983) and most recently Chippendale (1988) in *Flora of Australia*.

The same level of confusion has prevailed in South Australia. Specimens of this unnamed mallee-box have been collected in the Bordertown area and recognised as *E. viridis*. However, only a few authors, through distribution maps, have acknowledged this; these were Goodman (1973) and Chippendale (*l.c.*). Yet other collections of the same mallee-box from the same area have been diagnosed as *E. odorata*. To say the least, such misidentifications are perplexing as markedly contrasting rough-barked trees comparable with typical *E. odorata* are not uncommon in the area. Chippendale and Wolf (1981), however, recognise the presence in the area of *E. odorata* var. *angustifolia* Blakely, a poorly defined taxon, whose type specimen was collected from the Eyre Peninsula, but made no reference to *E. viridis*. Later Chippendale (*l.c.*) discarded that taxon in his *Flora of Australia* treatment. Presumably they had been referring to the unnamed mallee-box.

Despite a history surrounded by neglect, confusion and obscurity, clear evidence accumulated using comparative studies with seedlings and cultivated specimens and from detailed examinations in the field, strongly confirms that this mallee-box eucalypt is a distinct species.

## TAXONOMY

*Eucalyptus wimmerensis* K. Rule *sp. nov.*

*Species nova ad Eucalyptum seriem Subbuxalibus pertinens. Frutex cortice laevi vel raro fibroso ad basin, glaucedinem deficiens, folius plantularum cinereis vel thalassicis hebetibus, adultis erectus*

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olivaceis vel thallicis nitentibus, alabastris ad  $6 \times 4$  mm leviter costatis, fructibus ad  $6 \times 6$  mm leviter costatis.

HOLOTYPE: Victoria, Lawloit Range on the Western Highway between Nhill and Kaniva,  $36^{\circ} 24'S$ ,  $141^{\circ} 31'E$ , 27.xii.1964, *J. H. Willis s.n.* (MEL).

*Shrubby or slender mallees* to 4 m or rarely taller mallees to 12 m, never a tree habit. *Branches* erect and foliage usually dense, particularly on shrubby specimens. *Bark* smooth to the ground, grey to brown, or stems of taller mallees with a short stocking of fibrous, tight greyish bark rarely higher than 1 m; with old bark deciduous in ribbons. *Seedling leaves* sessile, decussate, narrow-elliptical for the first 3 or 4 pairs, becoming shortly petiolate, alternate, linear-lanceolate to narrow-lanceolate or linear-oblong to narrow-oblong, dull, grey to blue-green, but never waxy, concolorous, tapering at the base, acute or acuminate, semi-erect,  $6.5 \times 1.6$  cm. *Intramarginal and lateral veins* visible but not conspicuous. *Juvenile leaves* alternate, petiolate, similar in shape to seedling leaves, dull, semi-erect, reaching adult size by 4 to 9 pairs. *Adult leaves* petiolate, linear-lanceolate or linear-oblong to narrow-lanceolate or narrow-oblong, sometimes slightly falcate, olive-green to blue-green, semi-lustrous, with older leaves lustrous, acute or acuminate, uncinata, erect in relation to the axis, with tapered bases, slightly sclerophyllous, to  $8.0 \times 1.5$  cm. *Petioles* to 1.3 cm long, slightly flattened. *Intramarginal and lateral veins* visible but not conspicuous. *Intramarginal veins* less than 2 mm from margins. *Oil glands* abundant. *Branchlets* slightly angled. *Inflorescences* simple and axillary, either along the main axis or concentrated in leafless, terminal clusters. *Peduncles* slightly angled, to 1.3 cm long. *Floral buds* in umbels of (5-)7(-9-11), fusiform to clavate, subsessile to shortly pedicellate, not scarred, to  $6 \times 4$  mm. *Sepaline and petaline opercula* adnate, conical or slightly obtuse, shorter than hypanthium. *Hypanthium* tapered into pedicel, slightly angled. *Flower colour* white. *Filaments* irregularly flexed, all fertile. *Anthers* adnate, basifixed, globoid, dehiscing by subterminal slits. *Style* to 5 mm long, with a blunt, disc-like stigma. *Fruit* with tapered base, subcylindrical, ovoid-truncate or cupular, lightly rugulose when dry, subsessile to shortly pedicellate, often burnished, to  $6 \times 6$  mm. *Pedicels* slightly angled, relatively thickened in mature fruits, to 3 mm long. *Locules* (3-)4(-5). *Rim* thin but wall relatively thickened in mature fruits. *Disc* descending. *Fertile seeds* brown to dark brown, ovoid to  $\pm$  cuboid, ovate to elliptical in profile, dorsal surface shallowly reticulate, hilum ventral. (Fig. 1)

#### SPECIMENS EXAMINED:

Victoria—At the entrance to the Little Desert N.P., 7 km S of Kiata,  $36^{\circ} 26'S$ ,  $141^{\circ} 48'E$ , *D. Albrecht* (MEL); Wonwondah North, 12 miles SW of Horsham, J. Smith Reserve, 26.ix.1969, *A. C. Beauglehole 31002* (MEL); SW side of Mt Arapiles, 5.ix.1969, *A. C. Beauglehole s.n.* (MEL 531783); Sandplain W of Mt Arapiles,  $36^{\circ} 48'S$ ,  $141^{\circ} 42'E$  23.viii.1979, *M. I. H. Brooker* (MEL 59870); 17 km NE of Gymbowen,  $36^{\circ} 36'S$ ,  $141^{\circ} 48'E$ , 1.ix.1979, *M. G. Corrick 6302* and *B. A. Fuhrer* (MEL); Gerang-Gerang, 2 km E on Western Highway,  $36^{\circ} 22'S$ ,  $141^{\circ} 54'E$ , 15.x.1965, *W. Middleton* (MEL); Lawloit Range, on the Western Highway between Nhill and Kaniva,  $36^{\circ} 21'S$ ,  $141^{\circ} 31'E$ , 25.v.1985, *K. Rule 385* (MEL).

#### DISTRIBUTION (Fig. 2):

Field observations and herbarium collections indicate that *E. wimmerensis* has a scattered distribution over a wide area in the vicinity of Western Victoria's Little Desert and adjacent areas of South Australia. The areas of the Northern Little Desert, including adjacent farmland between Dimboola and Nhill, and the Lawloit Range between Nhill and Kaniva appear to contain the bulk of the populations. Collections have also been made near Bordertown in South Australia, in the heart of the Little Desert to the south of Nhill, near Mt Arapiles, in the malleelands to the SW of Horsham and in the Wyperfeld National Park. These outlying populations indicate an extensive distribution and raise the possibility of others existing in the intervening tracts and further afield.

The clearing of marginal land for farms has no doubt brought about the elimination or marked depletion of many populations of *E. wimmerensis*. By contrast, within the Little Desert there are substantial tracts of relatively inaccessible mallee

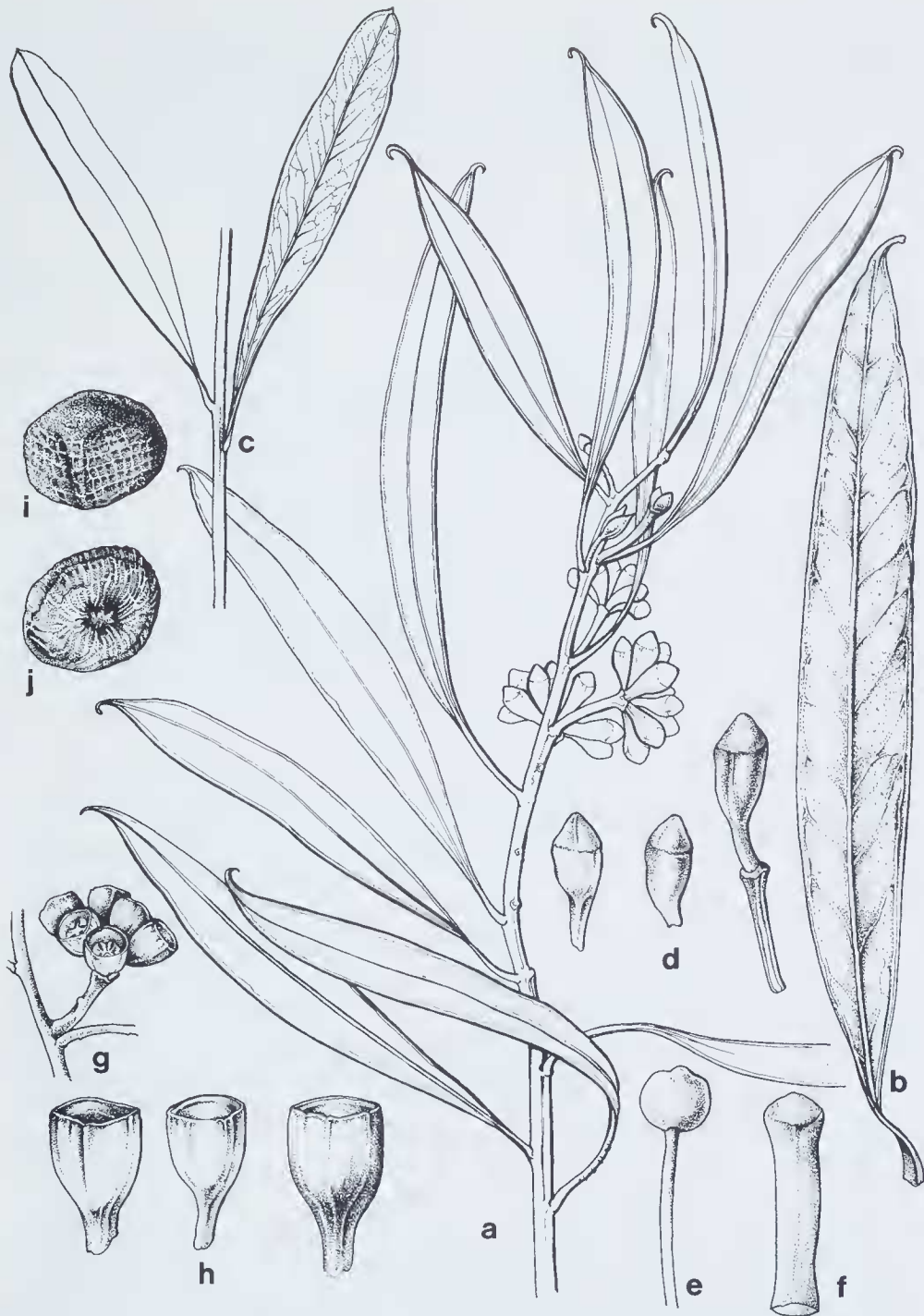


Fig. 1. *Eucalyptus wimmerensis*. a—branchlet,  $\times 1$ . b—adult leaf,  $\times 2$ . c—juvenile leaf,  $\times 1$ . d—buds just prior to anthesis,  $\times 2$ . e—anther,  $\times 30$ . f—style,  $\times 7$ . g—fruits,  $\times 1$ . h—fruits,  $\times 2$ . i and j—fertile seeds,  $\times 10$ .

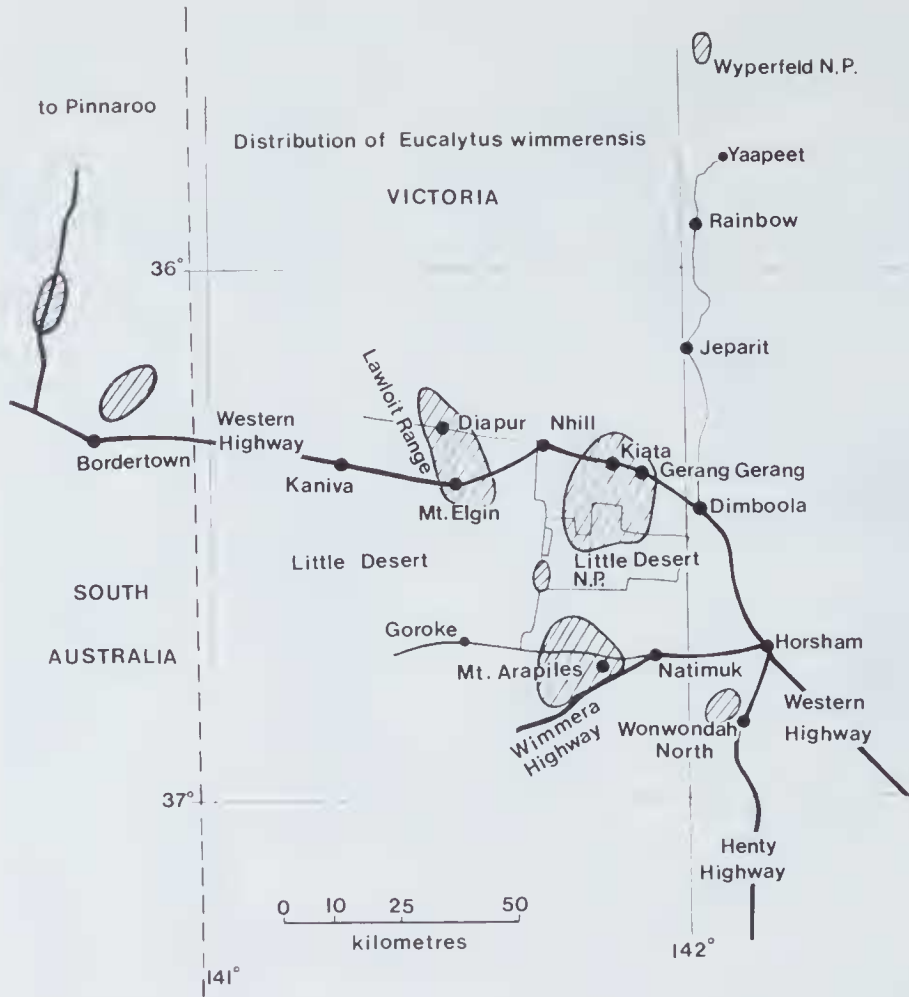


Fig. 2. Known distribution of *Eucalyptus wimmerensis*.

scrubland and it is highly likely that these areas harbour substantial numbers of the species.

*E. wimmerensis* tends to favour habitats featuring shallow sands or red-brown mallee loams over deep clays which may become water-logged in winter. However, in the Lawloit Range, which is a low sedimentary formation, where the type specimen was collected, the soils are well-drained gravelly-clays.

#### AFFINITIES:

Its adnate, basifixed anthers place *E. wimmerensis* in the informal Section *Adnataria* Pryor & Johnson. *E. wimmerensis* further possesses a range of features, both reproductive and vegetative, particularly the fused condition of its sepaline and petaline opercula, which places it firmly within the informal Series *Odoratae* Pryor & Johnson (alternatively Series *Subbuxaeales* Blakely). More specifically, its seedling morphology indicates a position in Superspecies *Odorata* Pryor & Johnson adjacent to *E. odorata* and *E. polybractea* R. T. Baker.

The concept of the mallee-box was formally applied by Blakely (1965). In that sense the term implied a box species with a mallee habit and at least some basal bark. Pryor & Johnson (1971) redefined the terms of reference and devalued bark and habit in favour of reproductive characters. Their Series *Odoratae* included

*E. odorata*, *E. polybractea*, *E. froggattii* Blakely, *E. lansdowneana* F. Muell. & J. Brown, *E. porosa* F. Muell. ex Miq., *E. sparsa* Boomsma (then undescribed but coded) and *E. viridis*. Also included were two medium to tall forest species, viz. *E. argophloia* Blakely, an entirely smooth-barked species, *E. bosistoiana* F. Muell. Chippendale (1988) correctly employed the Series *Subbuxaeales* but transferred *E. lansdowniana* to another Series of box species. A summary the features which characterise the mallee-boxes is presented in Table 1.

Table 1. Common Features of Mallee-Boxes

Characters	Notes
Bark	Rough, fibrous, or flakey, usually on lower half of stem, smooth with deciduous ribbons above.
Juvenile Leaves	Decussate, sessile, becoming alternate, petiolate, concolourous or slightly discolourous, with no radical change in form from the seedling to adult stage.
Inflorescences	Axillary, simple, along the main axis but also in short apparently terminal leafless clusters.
Umbels	Buds (5-)7(-9-11)
Buds	Small and relatively inconspicuous, ovoid to clavate or fusiform, subsessile usually lightly angled; opercula fused, lacking outer operculum scar.
Anthers	Globoid to cuboid, small lateral or subterminal slits as pores.
Stamens	All-fertile, irregularly flexed.
Fruits	Small and relatively inconspicuous, hemispherical to ovoid-truncate or cylindrical, disc descending, valves enclosed, sessile to shortly pedicellate.
Fertile Seeds	± cuboid with round, elliptical or ovate profile, dorsal surface shallowly reticulate, hilum ventral.

As noted above, *E. viridis* and *E. odorata* are two mallee-box species which figure prominently in the history of *E. wimmerensis* and this association is a reflection that it has some degree of affinity with each. *E. polybractea* is another species whose features indicate a significant level of affinity with the species. Features which permit critical distinctions and comparisons between *E. wimmerensis* and its presumed relatives are discussed below (see also Table 2).

*E. wimmerensis* frequently has been mistaken for *E. viridis* as both exhibit relatively narrow, semi-lustrous adult leaves and small, inconspicuous fruits. As well, Victorian populations of *E. viridis* invariably feature the mallee habit. Their distributions are not known to overlap and, no doubt, opportunities for meaningful comparisons have been difficult, thus contributing to the confusion. The nearest recorded population of *E. viridis* is at Wedderburn in North Central Victoria, approximately 150 km to the east of the Little Desert.

The linking of *E. wimmerensis* and *E. viridis* obviously has had its source in similarities in adult characters. However, criteria for determining any eucalypt's taxonomic status or affinities should not involve such characters applied in isolation as there is always the possibility that substantial differences in the juvenile state may be masked. The case of *E. wimmerensis* and *E. viridis* is no exception. The juvenile leaves of *E. wimmerensis* differ from those of *E. viridis* in that they are broader, duller and differently coloured, the latter's being linear, semi-lustrous and green to dark green.

At a less conspicuous level, the two species are different in their adult morphology. *E. wimmerensis* has broader leaves, but those of *E. viridis* are copiously dotted with oil glands and have very faint intramarginal veins and no apparent lateral veins, features which do not apply to *E. wimmerensis*. Their fruits also differ as those of *E. viridis* are usually smaller and never ribbed. Further, they possess short, distinct, slightly slender pedicels which contrast subtly from the slightly thickened, tapered ones of *E. wimmerensis*.

Table 2. Comparative Features of *E. wimmerensis* and its Relatives

Characters	<i>E. wimmerensis</i>	<i>E. odorata</i>	<i>E. polybractea</i>	<i>E. viridis</i>
<b>Juvenile Leaves</b>				
Colour	grey to blue-green, dull	grey-green to blue-green, dull	grey to blue-green, dull	green, semi-lustrous
Surface wax	absent	absent	present	absent
Size	to 6.5 × 1.6 cm	to 7.5 × 3.0 cm	to 10.0 × 1.5 cm	to 11 × 0.6 cm
Secondary venation patterns	visible, not conspicuous	conspicuous, with minor network often visible	visible, but not conspicuous	not readily observable
<b>Adult leaves</b>				
Colour	olive-green to blue-green, semi-lustrous	grey-green to olive-green, dull	grey to grey-green, dull	green to dark green, semi-lustrous or lustrous
Leaf bud surface wax	absent	absent	present	absent
Size	to 8.0 × 1.5 cm	to 12.0 × 2.0 cm	to 8.0 × 1.5 cm	to 6.0 × 0.8 cm
Petiole length	to 1.3 cm	to 1.7 cm	to 1.5 cm	to 0.5 cm
Secondary venation patterns	visible	usually conspicuous	visible	not visible
Intramarginal vein distance from edge	< 2 mm	± 2 mm	< 2 mm	± 1 mm (if visible)
<b>Floral Buds</b>				
Surface wax	present	absent	present	absent
Angles/Ribbing	slightly angled	slightly angled	faint ribbing	absent
Pedicle length	to 5 mm	to 7 mm	to 7 mm	to 5 mm
Peduncle length	to 1.3 cm	to 1.0 cm	to 1.2 cm	to 0.9 cm
Size	to 6 × 4 mm	to 8 × 5 mm	to 6 × 4 mm	to 4.5 × 3 mm
<b>Fruit</b>				
Angles/Ribbing	slightly angled	slightly angled	faint ribbing or smooth	smooth
Pedicle length	to 3 mm	to 4 mm	to 5 mm	to 3 mm
Size	to 6 × 6 mm	to 8 × 6 mm	to 6 × 5 mm	to 5 × 4 mm
<b>Bark</b>	smooth or rarely basal, fibrous	chunky fibrous stocking to at least major branches	fibrous stocking confined to base or lower stem	fibrous stocking, confined to lower stem
<b>Habit</b>	small or rarely medium mallees	occasionally small to medium mallees, more often small to medium trees	small to medium mallees or slender trees	small mallees or small slender trees
<b>Flowering time</b>	summer to late autumn	autumn to early spring	autumn to winter	summer to autumn

*E. odorata*, the other species with which *E. wimmerensis* has been confused, is mainly South Australian in such areas as the Eyre Peninsula, the Flinders and Lofty Ranges, the Fleurieu Peninsula, Kangaroo Island and the Upper South East. A few collections comparable with the typical form have been made in the Wimmera, mainly close to the South Australian border. However, most collections attributed to *E. odorata* from that region represent misidentifications of *E. wimmerensis*, as studies of collection sites and herbarium specimens confirm. Collections from North Central Victoria also have been attributed to *E. odorata*. These, however, are neither that species nor *E. wimmerensis*, but represent an anomalous box superficially resembling *E. odorata* whose status and origins are as yet undetermined.

The confusion of *E. wimmerensis* with *E. odorata* has stemmed from similarities in bud and fruit morphology and from overlap in adult leaf widths. In particular, the fruits of *E. wimmerensis*, although marginally smaller than those of *E. odorata*, are practically inseparable in form, both having the same range of shapes, being slightly angled and having tapered, slightly thickened pedicels.

Rough, chunky, persistent bark to at least the major branches and usually a tree habit are features which readily distinguish *E. odorata* from *E. wimmerensis*. As well, *E. odorata* has duller and usually broader adult leaves which regularly exhibit a more conspicuous pattern of venation. With regard to leaf sizes, *E. odorata* var. *angustifolia* has widths that might be confused with those of *E. wimmerensis*. In most respects, the juvenile leaves of both species are similar, being dull with much the same range of colours and exhibiting comparable but not identical patterns of venation, except those of *E. odorata* are usually broader, often reaching elliptical, ovate or lanceolate proportions.

*E. polybractea*, a species occurring in North Central Victoria and the Riverina of New South Wales, is another mallee-box closely related to *E. wimmerensis*. Differences in adult characters are obvious and, no doubt, have inhibited confusion between the two species. The current season's adult foliage of *E. polybractea* is dull and strikingly grey or grey-green, often carrying slightly waxy leaf buds. Nonetheless, they are similar in shape, size and venation pattern to *E. wimmerensis*. The floral buds also are often slightly waxy. Further, the fruits of *E. polybractea* are subtly different to those of *E. wimmerensis*, although similar in shape and size, they are smooth or rarely only very faintly ribbed and often have pedicels that are marginally longer and slightly more slender. Also, there are differences and similarities in juvenile leaves. Differences are limited to the extent that those of *E. polybractea* are usually slightly waxy and marginally longer than those of *E. wimmerensis*. On the other hand, the juvenile leaves of the two species are similar in colour and also exhibit patterns of venation that approximate each other.

There is some conjecture regarding the relationship between *E. wimmerensis* and *E. viridis*, with some observers maintaining that they are sister species. However, within this narrow mallee-box context, seedling morphology suggests the affinity between the two is not close as speculated, and this is further supported by subtle differences in adult characters, particularly leaves. It is my firm opinion that those similarities which have caused the two species to be confused with each other are superficial and indicative of an appreciable level of convergence in adult characters. Coming to terms with adult convergence has been a major problem in *Eucalyptus* taxonomy. This is best illustrated by the example of the informal Series *Foecundae* Pryor & Johnson where Brooker (1988) recognised that no less than seven species had been lost under *E. foecunda* Schauer because critical differences, particularly in juvenile leaves, had been ignored in favour of readily observable adult characters.

Similarities in particular aspects of juvenile leaf and fruit morphologies and, to a lesser extent, adult leaf morphology suggest that *E. wimmerensis* and *E. odorata* are closely related. Differences in bark, habit and adult leaf lustre suggest a level of divergence that does not detract from this affinity.

The level of affinity of *E. wimmerensis* with *E. polybractea* needs clarification. As indicated above, except for their surface wax and marginal differences in size, the juvenile leaves of *E. polybractea* do not vary markedly from those of *E. wimmerensis*. Of course, some observers might suggest that the two could be distanced from each

other on the basis of *E. polybractea* possessing surface wax. However, evidence of Boland (1979), Brooker (1986) and others suggests that the presence or absence of surface wax alone is insufficient in determining affinities, let alone segregating species. Whilst this evidence would indicate a close affinity based on similarities in juvenile leaves, adult characters permit greater insight. Although there are similarities in leaf venation patterns and fruit size and shape, appreciable differences leaf colour and lustre and marginal differences in fruit ribbing and pedicel morphology indicate a substantial level of divergence in adult characters. There is little doubt that the two species are closely related and that they would be positioned in the vicinity of each other within the Superspecies *Odorata* if Pryor and Johnson's informal linear classification were applied to this mallee-box context. It is also apparent from the level of divergence in the adult characters that *E. odorata* is an even closer relative.

#### KEY TO MALLEE-BOX SPECIES IN WESTERN VICTORIA AND ADJACENT REGIONS

1. Current season's adult leaves dull
  2. Bark fibrous, chunky, persistent, on half or more of the stem; adult leaves grey-green to olive-green; surface wax absent from all structures.....*E. odorata*
  2. Bark fibrous, basal or confined to lower half of stem; adult leaves grey to grey-green; surface wax often present on leaf and floral buds.....*E. polybractea*
1. Current season's adult leaves semi-lustrous or lustrous
  3. Adult leaves 8 mm wide or narrower, with lateral veins not visible, green to dark green; juvenile leaves linear, rarely broader.....*E. viridis*
  3. Adult leaves broader than 8 mm wide, with lateral veins visible, olive-green to blue-green or yellow-green to light green; juvenile leaves never linear
    4. Adult leaves olive-green to blue-green, 1.5 cm wide or narrower, with faint intramarginal veins less than 2 mm from margins.....*E. wimmerensis*
    4. Adult leaves yellow-green to light-green, usually broader than 1.5 cm, with conspicuous intramarginal veins 2 mm or greater from margins
      5. Buds and fruits square in section.....*E. froggattii*
      5. Buds and fruits round in section.....*E. porosa*

#### ASSOCIATED SPECIES:

*E. wimmerensis* tends to grow in pure stands, but sometimes is the most common species in mixed mallee communities and may be associated with a sprinkling of *E. calycogona* Turcz., *E. leptophylla* F. Muell., *E. incrassata* Labill., *E. dumosa* Cunn. ex Oxley and *E. anceps* (R.Br. ex Maiden) Blakely. *E. froggattii* also is an associate in the Horsham malleelands. An unnamed subspecies of *E. leucoxyton* F. Muell. is an occasional associate in north-western areas of the distribution and in the Little Desert, but is often found in pure stands in the vicinity, as is *E. arenacea* Marginson & Ladiges. There are several other species to be found within the range of *E. wimmerensis* but they occupy different habitats which do not favour mallee communities. Curiously, however, at Mitre Rock in the Mt Arapiles area, there is a hybrid swarm obviously derived from *E. microcarpa* Maiden. Even though no specimens of pure *E. wimmerensis* were observed in the immediate area, it is suspected as being the other parent. Other hybrids of *E. wimmerensis* have been observed. At the type locality there are several mallees whose characters strongly suggest an influence from *E. dumosa*, whilst in the Kiata area hybrids with the unnamed subspecies of *E. leucoxyton* have been observed where the two species abut.

#### FLOWERING TIME:

Summer to late autumn.

#### ETYMOLOGY:

The specific epithet recognises the Wimmera Region of Western Victoria where the bulk of the *E. wimmerensis* populations are naturally distributed and where the type specimen was collected.



## CONSERVATION NOTES:

The populations along the farming belt to the north of the Little Desert are severely depleted and are restricted to roadside verges and remnants on private farms. The populations in the Lawloit Range, which appear to be the western extremity of the distribution, have been affected by clearing. The one from which the type specimen was collected is the most extensive remnant, being of several hundred plants on both private and public land. The populations in areas of Mt Arapiles and the Horsham malleelands are also depleted but small segments are secure protected reserves.

By contrast, numbers of *E. wimmerensis* are in relative abundance and quite secure within the Little Desert National Park, particularly in the area to the south of Kiata.

By some standards *E. wimmerensis* would be regarded as moderately rare, despite its distribution being relatively widespread and the prospects for the discovery of yet unrecorded populations quite good. However, its apparent rarity provides reasonable grounds to suggest that relevant conservation authorities take steps to protect whatever numbers they can. The type population in the Lawloit Range offers such an opportunity.

Although only a few populations of *E. wimmerensis* have been observed near Bordertown, it is possible that more will be recognised in time in adjacent localities. Thus, within South Australia, it should be regarded as rare. As is recommended in the Victorian case, the relevant authorities should take steps to protect these known populations.

## ACKNOWLEDGEMENTS

I am indebted to Mr Ian Brooker of the Division of Plant Industry, C.S.I.R.O., Canberra, for both the Latin diagnosis and for his expert guidance and support throughout the course of the *E. wimmerensis* project. I am also indebted to Dr Don Foreman of the National Herbarium of Victoria, Melbourne, for his valuable assistance in the preparation of the manuscript. Further, I am appreciative of Mrs Anita Barley, also of the National Herbarium of Victoria, Melbourne, not only for producing the illustrations and map but for their excellent quality. The contributions of several other individuals are also acknowledged. These include Mrs Beverley Overton of Kangaroo Island for her personal communications regarding the island's eucalypts, Mr David Albrecht of the National Herbarium of Victoria, Melbourne, for his generous assistance on numerous occasions, Mr James Matters of the Department of Conservation, Forests and Lands for maps on Western Victorian soils and Mr Stephen Haby and Mr Richard Alcorn, both of Horsham, for information which greatly assisted field studies in that area.

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